REMARKS/ARGUMENTS

Brief Summary of Status

Claims 1-30 are pending in the application.

Claims 1-30 are rejected.

35 U.S.C. § 103

The Examiner asserts:

"2. Claims 1, 3-6, and 8-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ertel et al (US 7,031,290 B2) in view of Ariyoshi et al (US Patent 5,930, 244). Hereinafter referred as Ertel and Ariyoshi." (non-final office action, Part of Paper No./Mail Date 20080228, p. 2)

The Applicant respectfully traverses.

The Applicant has amended certain of the claims.

In the office action, with respect to the Applicant's independent claims 1 and 6, the Examiner asserts that Ertel teaches and discloses "a cable modem system that is operable using synchronous code division multiple access for a plurality of channels (column 1 lines 15-19)".

In this Examiner-cited portion of Ertel, Ertel teaches and discloses:

"These teachings relate generally to wireless communications systems and methods, and relate in particular to techniques for assigning pseudo-noise (PN) spreading codes to users in a Synchronous Code Division Multiple Access (S-CDMA) system." (Ertel, col. 1, lines 15-19, emphasis added)

With respect to the Applicant's preambles of the Applicant's independent claims 1 and 6, the Applicant claims a cable modem system that is operable using synchronous code division multiple access for a plurality of cable modem channels.

Not only is the teaching and disclosure of Ertel is primarily geared towards the subject matter of wireless communication systems, and the Applicant claims subject matter geared towards a cable modem system, but the Applicant also respectfully points out that the characteristics of at least some of the hardware employed within such communication systems of Ertel, as explicitly described in Ertel, are "quite different"

from those used in cable modem systems [e.g., "The presently preferred PHY is quite different from cable modem and xDSL industry standards, as well as existing IEEE 802.11 standards." (Ertel, col. 11, lines 58-60, emphasis added)]

The Applicant respectfully points out that one having ordinary skill in the art, when considering the explicit language and comments within Ertel, in that, the "presently preferred PHY" may not necessarily be most desirable for use in systems that comply and comport with the "cable modem and xDSL industry standards", most likely would not consult Ertel for subject matter relating to a cable modem system.

The Applicant respectfully believes that the fact that the Ertel focuses primarily on wireless communication systems, coupled with the fact that Ertel teaches and discloses that "The presently preferred PHY is quite different from cable modem and xDSL industry standards" would probably lead one of ordinary skill in the art away from consulting Ertel to find subject matter related to a cable modem system in accordance with the subject matter as claimed by the Applicant.

Also, in the office action, with respect to the Applicant's independent claims 1 and 6, the Examiner asserts that Ertel teaches and discloses "a channel termination system (User Equipment (12) in figure 1)" (emphasis added).

The Applicant respectfully points out that the Applicant claims subject matter including a "cable modem termination system", and the Applicant also respectfully points out that the "User Equipment (12) in figure 1" of Ertel is not equivalent to such a "cable modem termination system" in accordance with the subject matter as claimed by the Applicant.

The Applicant respectfully points out that the "User Equipment (12) in figure 1" of Ertel does not perform channel termination, but is instead a piece of user-end equipment (i.e., at a subscriber's home or place of business).

Also in the office action, the Examiner also asserts that Ertel teaches and discloses "a channel network segment that communicatively couples the channel termination system to the plurality of channel".

The Applicant respectfully points out that the Examiner fails to identify any particular section of Ertel (in either Ertel's written description or figures) as teaching and disclosure such a subject matter limitation.

In contrast, the Applicant also respectfully points out that the Applicant claims subject matter that includes a cable modem network segment that communicatively couples the cable modem termination system to the plurality of cable modems.

The Applicant respectfully points out that the Examiner-identified "channel termination system", which the Examiner identifies as Ertel's "User Equipment (12) in figure 1", is simply coupled to one, singular SS 10 in FIG. 1 of Ertel. There does not appear to be a plurality of channels coupled to the Examiner-identified "channel termination system" (i.e., which Examiner associates with Ertel's "User Equipment (12) in figure 1").

The Applicant respectfully points out that Ertel teaches and discloses "Within this model, the PHY technique in accordance with these teachings provides access between one or more subscriber stations (SS) 10, also referred to herein simply as users, and base stations (BS) 11 to support the user equipment 12 and core network 14 interface requirements." (Ertel, col. 4, lines 11-15, emphasis added)

The Applicant respectfully points out that there does appear to be multiple connections between the "base stations (BS) 11" and "one or more subscriber stations (SS) 10", but any one "User Equipment (12) in figure 1" appears to be coupled to only one "subscriber station (SS) 10" (i.e., only one channel, not a plurality of channels, couples any one "User Equipment (12) in figure 1" to its corresponding one "subscriber station (SS) 10").

As such, the Applicant respectfully believes that while there may be a multiple channels that couple the "base station (BS) 11" with "one or more subscriber stations (SS) 10", the Applicant respectfully points out that the Examiner-identified "a channel termination system (User Equipment (12) in figure 1)" couples to its corresponding "subscriber station (SS) 10" via one channel. However, more than one "subscriber station (SS) 10" may use the same orthogonal code.

Moreover, in the office action, with respect to the Applicant's independent claims 1 and 6, the Examiner asserts that Ertel teaches and discloses "wherein the channel termination system is operable to provide network access to each channel within the plurality of channel (Core Network (14) in figure 1)" (emphasis added).

Again, the Examiner seems to equate the "a channel termination system" with Ertel's "(User Equipment (12) in figure 1)". The Examiner also seems to equate "network access" with Ertel's "(Core Network (14) in figure 1)". The Applicant respectfully points out that the "(Core Network (14) in figure 1)" couples to the "base station (BS) 11" in FIG. 1 of Ertel, and not to Ertel's "(User Equipment (12) in figure 1)", which the Examiner seems to equate with "a channel termination system".

In the subject matter as claimed by the Applicant in independent claim 1, the Applicant claims the cable modem termination system is operable to provide network access to each cable modem within the plurality of cable modems.

Ertel's "(User Equipment (12) in figure 1)", which the Examiner seems to equate with "a channel termination system", does not provide any "network access" to the "(Core Network (14) in figure 1)".

Rather, the "base station (BS) 11" in FIG. 1 of Ertel is coupled to the "(Core Network (14) in figure 1)".

Also, the fact that the "base station (BS) 11" in FIG. 1 of Ertel may also include a "multi-element adaptive array 11A" which makes it "theoretically possible for the spectral efficiency of the cell to scale linearly with the number of antennas in the BS array 11A." (Ertel, col. 4, lines 17-18 and Ertel, col. 6, lines 59-60), also teaches away from the subject matter as claimed by the Applicant.

As described elsewhere on Ertel, this "multi-element adaptive array 11A", when implemented within a "base station (BS) 11", allows for the reuse of a code to communicate with "one or more subscriber stations (SS) 10" [i.e., "SDMA uses the antenna array 11A at the BS 11 to spatially isolate same code SSs 10 in the cell. The number of times that a code may be reused within the same cell is dependent upon the number of antenna elements in the array 11A, the array geometry, the distribution of users in the cell, the stability of the channel, and the available processing power." (Ertel, col. 10, lines 25-31, emphasis added)]

There may be "same code SSs 10 in the cell" in accordance with the teaching and disclosure of Ertel (i.e., more than one SS 10 uses the same orthogonal code in the very same cell).

With respect to the Examiner-identified "(Multi-element adaptive array in figure 1)", the Applicant respectfully points out that the effective use of this element in Ertel employs "SDMA" (i.e., not S-CDMA). As cited above, Ertel teaches and discloses 3 separate schemes (SDMA, CDMA, and S-CDMA): "SDMA uses the antenna array 11A at the BS 11 to spatially isolate same code SSs 10 in the cell." In other locations, Ertel describes the distinctions between "synchronous direct-sequence code division multiple access (S-CDMA)", "code division multiple access (CDMA)", and "space division multiple access (SDMA)".

Ertel teaches and discloses:

"In a synchronous direct-sequence code division multiple access (S-CDMA) system, users communicate simultaneously using the same frequency band via orthogonal modulation or spread spectrum. The number of orthogonal spreading codes (>1) limits the total capacity of the system. To increase the capacity of a CDMA system in a given service area, without requiring additional frequency bandwidth, space division multiple access (SDMA) can be employed.

In S-CDMA systems a set of orthogonal DS-CDMA codes are assigned to the cell of interest. However, the number of available orthogonal codes for a given spreading factor is limited, resulting in the capacity of the conventional S-CDMA system often being code limited." (Ertel, col. 1, lines 23-36, emphasis added)]

The Applicant respectfully believes that Ertel explicitly teaches and discloses the use of "space division multiple access (SDMA)" in conjunction with "a CDMA system" to increase the capacity of the "a CDMA system".

The very title of Ertel suggests the use of "SDMA" (i.e., "CODE ASSIGNMENT ALGORITHMS FOR SYNCHRONOUS DS-CDMA LINKS WITH SDMA USING CHANNEL SCANNING").

Ertel also teaches and discloses:

"In accordance with an aspect of these teachings, a code assignment algorithm is described for S-CDMA wireless communications systems that utilizes SDMA to enhance system capacity. The code assignment algorithm is applicable to both the forward and the reverse channels. The inventors have realized that when SDMA is used in conjunction with S-CDMA it becomes possible to reuse code sequences within the same cell, thereby

providing an increase in system capacity. Theoretically, with an M element antenna array receiver it is possible to reuse each code sequence M times.

The ability of the SDMA system to provide orthogonal code channels to each user is a function of the spatial properties of the users that are assigned an identical spreading code. Therefore, when assigning codes to new users, care is taken to insure that the set of users that are assigned an identical code are spatially compatible. A good code assignment scheme in accordance with these teachings assigns identical codes to users having most dissimilar spatial properties.

In the presently preferred embodiment of these teachings a code assignment algorithm is based upon the use of a channel scanning procedure for placing users into spatially compatible groups, and the algorithm attempts to assign identical code sequences to uses having the most different spatial properties with respect to one another. The metric used in determining the level of difference in the spatial properties of the users is power measured at a multi-element antenna array on each code, assuming that a weight vector is equal to a spatial signature vector of the current user. The code assignment algorithm works in both the forward and the reverse channels provided that the spatial signature vectors on each link can be estimated." (Ertel, col. 1, lines 23-36, emphasis added)]

As can be seen, in accordance with the use of "SDMA", which employs a "multi-element antenna array" inherently includes assigning "an identical code" to more than one user (i.e., "the set of users"), so long as the "set of users that are assigned an identical code are spatially compatible".

Therefore, the "multi-element antenna array" of Ertel, as identified by the Examiner, inherently involves using a same code (i.e., "an identical code") for more than one user.

As can be seen in the Applicant's claimed subject matter, as well as within the Applicant's originally filed specification (including figures and written description), the signals being sent to and from each individual cable modem employ a separate and distinct orthogonal code (e.g., Applicant's FIG. 3 where OC #1 spreads signal #1, OC #2 spreads signal #2, etc. and Applicant's FIG. 5 where OC #1 de-spreads to generate signal #1, OC #2 de-spreads to generate signal #2). Moreover, with respect to the Applicant's

FIG. 7, the OC code used to perform spreading the transmit block 701 and de-spreading in the receive block 702 is unique to that particular cable modem. For example, the Applicant teaches and discloses "P orthogonal codes to spread P data streams (signal #1, signal #2, …, to signal #P)" (Applicant's specification, p. 13, line 9), in that, there is a one to one relationship between the number of orthogonal codes (i.e., P) and the number of data streams that are being spread (i.e., P); one orthogonal code is employed to spread one particular data stream.

In contrast, the use of the Examiner-identified "(Multi-element adaptive array in figure 1)", in accordance with the teaching and disclosure of SDMA in Ertel, "an identical code" may be assigned to more than one user (i.e., a "the set of users"), so long as the "set of users that are assigned an identical code are spatially compatible". Ertel also teaches and discloses that "metric used in determining the level of difference in the spatial properties of the users is power measured at a multi-element antenna array on each code".

In short, the use of the Examiner-identified "(Multi-element adaptive array in figure 1)" seems directly related to using "space division multiple access (SDMA)" [as the title of Ertel also suggests], and this teaches away from the subject matter as claimed by the Applicant of a one to one relationship between the number of orthogonal codes (i.e., P) and the number of data streams that are being spread (i.e., P) and provided to a number of cable modems (e.g., P cable modems).

The Applicant also respectfully points out that the claims of Ertel deal with subject matter relating to "within a coverage area of a base station (BS) having a multi-element antenna array having M elements, estimating a spatial signature vector (SSV) for a current subscriber station" (e.g., see Ertel's claim 1).

Ertel's claim 4 recites "radio base unit (RBU) having a multi-element antenna array with M elements, a spatial signature vector (SSV) for a current subscriber station, for using the estimated SSV as a weight vector when determining the output power that is correlated with each of a plurality of spreading code sequences", and Erte's claim 7 recites "a base station (BS) having a multi-element antenna array having M elements, estimating a spatial signature vector (SSV) for a current subscriber station; using the

estimated SSV as a weight vector, determining the output power that is correlated with each of a plurality of spreading code sequences".

The use of these "spatial signature vector (SSV)" is one of the calculations used when employing such an Examiner-identified "(Multi-element adaptive array in figure 1)" in accordance with "space division multiple access (SDMA)" in accordance with the teaching and disclosure of Ertel.

It seems clear that the teaching and disclosure of Ertel is linked directly to the use of Examiner-identified "(Multi-element adaptive array in figure 1)" in accordance with the teaching and disclosure of "space division multiple access (SDMA)"in Ertel. This simply teaches away from the subject matter as claimed by the Applicant that has a one to one relationship between the number of orthogonal codes and the number of data streams that are being spread using those orthogonal codes.

Moreover, on page 3 of the office action, the Examiner asserts "the channel termination system provides pseudonoise code synchronization information to at least one channel (User equipment (12) in figure 1)".

Here, the Examiner seems to equate "at least one channel" with Ertel's "(User equipment (12) in figure 1)". However, earlier in the office action (p. 2), the Examiner seems to equate "a channel termination system" with Ertel's "(User Equipment (12) in figure 1)."

The Applicant respectfully points out that it would be appropriate for the Examiner to associate Ertel's "(User Equipment (12) in figure 1)" with only one component/element/item, and not two separate and distinct elements (i.e., "a channel termination system" and "at least one channel").

The Applicant respectfully requests clarification regarding the element with which the Examiner seems to associate Ertel's "(User Equipment (12) in figure 1)": "a channel termination system" or "at least one channel".

In view of at least the comments provide above, and for other reasons, the Applicant respectfully believes that Ertel is deficient in teaching and disclosure the subject matter limitations that the Examiner asserts in the office action.

On page 3 of the office action, the Examiner also asserts "However, Ertel fails to disclose the use of a plurality of cable modem. Ariyoshi shows in (figure 10) of a

network comprising a plurality of terminal stations. Also, Ariyoshi discloses in (column 6 lines 38-42) of a pseudo noise generator." (emphasis added)

In this written description portion of Ariyoshi corresponding to the Examiner-cited FIG. 10 of Ariyoshi, Ariyoshi teaches and discloses:

"FIG. 10 shows a radio communication system including of a plurality of base stations 401 (401-1 to 401-j) interconnected by a wired network and a plurality of terminal stations 402 (402-1 to 402-n) distributed within a communication area of each base station." (Ariyoshi, col. 1, lines 42-46, emphasis added)

With respect to the Applicant's preambles of the Applicant's independent claims 1 and 6, the Applicant claims a cable modem system that is operable using synchronous code division multiple access for a plurality of cable modem channels.

Again, like with Ertel, the Applicant respectfully points out that the teaching and disclosure of Ariyoshi is primarily geared towards the subject matter of radio communication systems, and the Applicant claims subject matter geared towards a cable modem system.

On page 4 of the office action, with respect to the Applicant's independent claim 11, the Examiner asserts "Ariyoshi discloses a cable modem that is operable using synchronous code division multiple access".

The Applicant cannot find any reference to a "cable modem" in Ariyoshi. The Applicant respectfully points out that Ariyoshi does teach and disclose "modem", which seems to be a "radio" operable modulator/demodulator (i.e., a "radio" modem) device employed within a radio communication system, and not a cable modem employed in a cable modem system in accordance with the subject matter as claimed by the Applicant.

Also on page 4 of the office action, with respect to the Applicant's independent claim 11, the Examiner asserts that Ariyoshi teaches and discloses: "a transmit block comprising an orthogonal code spreader and a pseudo-noise spreader (transmitting phase controller (315) in figure 9)".

Ariyoshi describes the operation of the Examiner-identified "(transmitting phase controller (315) in figure 9)" as follows:

"The phase synchronization control instruction PC-i is input to a transmission phase controller 315. In accordance with the contents of the phase synchronization

control instruction PC-i, the transmission phase controller 315 outputs a control signal PS-i which is used for fine adjustment of the phases of the orthogonal code Wi and pseudo noises PNr." (Ariyoshi, col. 6, line 60-65, emphasis added)

"The signal delay amounts at these delay circuits are controlled by the control signal PS-i output from the transmission phase controller 315 to thereby finely adjust the phases. An output signal of the second multiplier 322 is converted into a signal on a transmission frequency band by a radio frequency circuit 323 and transmitted from the antenna 301 via the circulator 302." (Ariyoshi, col. 7, line 37-43, emphasis added)

The Examiner-identified "(transmitting phase controller (315) in figure 9)" seems to operate to perform fine phase adjustment (i.e., "fine adjustment of the phases" and "finely adjust the phases"), and not be a transmit block comprising an orthogonal code spreader and pseudo-noise spreader.

Also, among other deficiencies of Ariyoshi, the Applicant respectfully points out that the Ariyoshi employs unique and distinct "pseudo noises PNr specific to each reverse link generated from a reception pseudo noise (PN) generator 211" (with reference to Ariyoshi's FIG. 2) and unique and distinct "pseudo noises PNf specific to each forward link generated by a pseudo noise (Tx-PN) generator 104" (with reference to Ariyoshi's FIG. 2) when performing spectrum spreading and de-spreading using PN codes. (see Ariyoshi, col. 4, lines 14-15 and col. 4, lines 51-52, emphasis added)

These PN codes of Ariyoshi are "specific to each reverse link" and "specific to each forward link". A singular PN code is not employed for all links in Ariyoshi.

In contradistinction, considering the Applicant's independent claim 1, the subject matter as claimed by the Applicant includes the cable modem termination system spreads the summed, orthogonal code spread signal using a pseudo-noise code to generate a pseudo-noise code signal.

Moreover, considering the Applicant's originally filed specification (including figures and written description), the Applicant employs a single PN code to perform PN code spreading of a summed orthogonal code spread signal (generated by summing a plurality of individual orthogonal code spread signals), and the Applicant employs a single PN code to perform PN code de-spreading of a received signal after it has

undergone front end processing and demodulation [e.g., see Applicant's FIG. 3 and FIG. 5 and associated written description].

Ariyoshi, in distinction from the Applicant's claimed subject matter, teaches and discloses PN codes that are "specific to each reverse link" and "specific to each forward link". The Applicant's claimed subject matter employs a singular PN code for the spreading and de-spreading for multiple orthogonal code spread signals (again, see Applicant's FIG. 3 and FIG. 5, associated written description, and claimed subject matter).

The deficiencies of Ertel and Ariyoshi with respect to the Applicant's claimed subject matter are many, including those described by the Applicant above.

The Applicant respectfully believes that the inclusion of Ariyoshi fails to overcome the deficiencies of Ertel.

The comments made above are also applicable to other of the Applicant's independent claims rejected above.

The Applicant respectfully asserts that Ertel and Ariyoshi, when considered individually or together, fails to teach and disclose each and every limitation of the subject matter as claimed by the Applicant in these claims.

In view of at least these comments made above, the Applicant respectfully believes that these independent claims rejected above are patentable over Ertel in view of Ariyoshi.

The Applicant respectfully believes that these dependent claims rejected above, being further limitations of the subject matter as claimed in allowable independent claims, respectively, are also allowable.

As such, the Applicant respectfully requests that the Examiner withdraw the rejections of these claims under 35 U.S.C. § 103(a) as being unpatentable over Ertel in view of Ariyoshi.

The Examiner asserts:

"3. Claims 2 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ertel et al (US 7,031,290 B2) in view of Ariyoshi et al (US Patent 5,930,244) in

view of Horne (US Patent 7,012,884 B2). Hereinafter referred as Ertel, Ariyoshi, and Horne." (non-final office action, Part of Paper No./Mail Date 20080228, p. 7)

The Applicant respectfully traverses.

The Applicant has amended certain of the claims.

The Applicant's comments made above with respect to Ertel and Ariyoshi are also applicable here.

In addition, the Applicant respectfully believes that the inclusion of Horne fails to overcome the deficiencies of Ertel in view of Ariyoshi.

The Applicant respectfully asserts that Ertel, Ariyoshi, and Horne, when considered individually or together, fails to teach and disclose each and every limitation of the subject matter as claimed by the Applicant in these claims.

In view of at least these comments made above, the Applicant also respectfully believes that independent claims 1 and 6 are allowable over Ertel in view of Ariyoshi in view of Horne.

The Applicant respectfully believes that these dependent claims rejected above, being further limitations of the subject matter as claimed in allowable independent claims, respectively, are also allowable.

As such, the Applicant respectfully requests that the Examiner withdraw the rejection of these claims under 35 U.S.C. § 103(a) as being unpatentable over Ertel in view of Ariyoshi in view of Horne.

The Applicant respectfully believes that claims 1-30 are in condition for allowance and respectfully requests that they be passed to allowance.

The Examiner is invited to contact the undersigned by telephone or facsimile if the Examiner believes that such a communication would advance the prosecution of the present U.S. utility patent application.

RESPECTFULLY SUBMITTED,

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